

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA**

PROGME CORPORATION
208 Clair Hill Drive
Rochester Hills, MI 48309,

Civil Action No. 2:17-cv-01488-GAM

District Judge Gerald Austin McHugh

Plaintiff

v.

COMCAST CABLE COMMUNICATIONS, LLC
1701 JFK Boulevard
Philadelphia, Pennsylvania 19103,

JURY TRIAL DEMANDED

**FOURTH AMENDED COMPLAINT
FOR PATENT INFRINGEMENT**

Defendant

Plaintiff Progme Corporation (hereinafter termed “Progme”) files this **FOURTH AMENDED COMPLAINT FOR PATENT INFRINGEMENT** against Defendant **COMCAST CABLE COMMUNICATIONS, LLC** for infringement of U.S. Patent No. 8,713,425 (“’425 Patent”). A copy of the ’425 Patent is attached as **Exhibit A**.

THE PARTIES

1. Progme is a corporation existing under the laws of Michigan with its principal place of business at 208 Clair Hill Drive, Rochester Hills, MI 48309.
2. On information and belief, Defendant Comcast Cable Communications, LLC is a limited liability company existing under the laws of Delaware with its principal place of business at 1701 JFK Boulevard, Philadelphia, Pennsylvania 19103. Defendant Comcast Cable Communications, LLC (“hereinafter termed Comcast”) is a wholly owned subsidiary and operating unit of Comcast Corporation.

JURISDICTION AND VENUE

3. This is an action for patent infringement arising under the Patent Laws of the United States, 35 U.S.C. § 1, et seq. including 35 U.S.C. § 271.

4. Subject matter jurisdiction is proper in this Court pursuant to 28 U.S.C. §§ 1331 and 1338(a).
5. Venue in this judicial district is proper under 28 U.S.C. §§ 1391 including 28 U.S.C. § 1391 (b) and (c) and 28 U.S.C. §§ 1400(b).
6. This Court has personal jurisdiction over Defendant Comcast. Defendant Comcast regularly conducts and transacts business in and within this judicial district itself and through one or more subsidiaries, affiliates, partners or other related parties and has committed and continues to commit acts of patent infringement in this judicial district.
7. Defendant Comcast engages in persistent courses of conduct and derives substantial revenue from products and/or services provided to individuals in this judicial district, purposefully establishing substantial, systematic and continuous contacts within this judicial district to reasonably expect to be haled into court here and/or to be subjected to Pennsylvania's long arm statute within this judicial district.
8. In addition, venue is proper because Defendant Comcast provides cable television service to people within this judicial district.

U.S. PATENT 8,713,425

9. On April 29, 2014, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 8,713,425 ("the '425 Patent"), entitled "AUDIO/VIDEO PROGRAM-RELATED HYPERLINK PRINTER", to Progme as assignee after a full and fair examination.
10. As indicated in the appended **Exhibit B**, Progme became the owner of all rights, title and interest in and to the '425 Patent by recorded assignment and possesses all rights of recovery under the '425 Patent, including the right to sue and recover damages for all

infringements. Since the date of said assignment, Progme has been and remains the sole owner of said rights, title and interest in and to the '425 Patent.

11. The '425 Patent discloses and claims, in part, a method for generating and encoding and an apparatus for receiving and processing an hyperlink address string structured as a PrintWriter method, the hyperlink address string comprising a resource identifier identifying a resource in the initial array position of a list in which resource identifiers uniquely identifying resources corresponding to predetermined program material are arrayed for transmission in conjunction with program signals representative of predetermined program material. See the '425 Patent at pg. 17, cols 37-39.
12. The '425 Patent further discloses and claims, in part, a predetermined hyperlink address to predetermined hyperlinked content indicated in a first attribute of said hyperlink address string structured as a PrintWriter method comprising a resource identifier to identify i) a resource from resources of threads performed in a Java Virtual Machine (JVM) and ii) an application, in which certain thread objects belong or a resource consumer related to the resource belongs, executed in said JVM; a resource consumer for each thread using a resource in said JVM; a resource manager to manage resource usage wherein said resource identifier and resource manager are generated using Java language and registered resource managers are stored according to types and a resource allocation policy comprising calling a resource identifier that is in an initial array position of a list in which resource identifiers uniquely identifying resources are arrayed or requesting an initial resource identifier that is first on an array in a resource identifiers list. See the '425 Patent at pg. 21, cols. 6-10, 12-14, 17-19, 26-38, 42-44, 50-52 and 59-63.

13. After disclosing that said resource identifier is in said initial array position or said initial resource identifier is first on an array in a resource identifiers list, the '425 Patent discloses that said resource identifier, in one embodiment, identifies a request for dynamically generated information wherein said request is mapped by a thread designated to handle said request. See the '425 Patent at pg. 22, cols 1-56.
14. It is well known by those skilled in the art that a VM is customarily defined as a computer programmed to emulate a hypothetical computer for applications relating to the transport of data.
15. It is well known by those skilled in the art that in Defendant Comcast's cable television delivery (distribution or transmission and reception) system, a virtual machine comprises either a frontend JVM or VM, for example at a production studio or headend, or a backend JVM or VM, for example at a digital television receiver or set-top box, wherein each said frontend and backend JVM or VM work together to communicate and interact with each other using Java code in the Java Programming Language including print() and println() statements of the PrintWriter method wherein said print() and println() statements of the PrintWriter method are generated and encoded to be transmitted in conjunction with program signals representative of predetermined program material typically at said frontend JVM or VM and received and processed at a receiver apparatus including said backend JVM or VM.
16. As disclosed and claimed in the '425 Patent, said receiver apparatus processes said hyperlink address string structured as a PrintWriter method to process A) a predetermined hyperlink address comprising said resource identifier to hyperlink to said resource in the initial array position of said list in which resource identifiers uniquely identifying

resources corresponding to predetermined program material are arrayed and B) a parameter instructing a PrintWriter to print predetermined printable output of said resource in the initial array position indicated in a second attribute of said hyperlink address string. See the '425 Patent, for example, at pg. 3, cols. 33-41, pg. 21, cols. 6-10 and claim 14.

17. The '425 Patent is valid and enforceable.

**COUNT I: DEFENDANT COMCAST'S DIRECT
INFRINGEMENT OF U.S. PATENT 8,713,425**

18. Plaintiff re-alleges paragraphs 1-17 as if fully set forth herein.

19. Defendant Comcast deploys individually named servlets in its cable television delivery system, each servlet defined by certain Java code "open-sourced" at github.com. See <https://github.com>.

20. Said certain Java code comprises Comcast Message Bus or Cloud Message Bus code (hereinafter termed "CMB code").

21. Said individually named servlets include: CNSControllerServlet of the com.comcast.cns.controller.CNSControllerServlet servlet-class having url pattern / servlet mapping, CNSControllerServlet of the com.comcast.cns.controller.CNSControllerServlet servlet-class having a /CNS/* url-pattern servlet-mapping, CQSControllerServlet of the com.comcast.cqs.controller.CQSControllerServlet servlet-class having url-pattern / servlet-mapping, EndpointServlet of the com.comcast.cmb.common.controller.EndpointServlet servlet-class having url pattern /Endpoint/* servlet mapping, AdminServlet of the com.comcast.cmb.common.controller.AdminServlet servlet-class having url pattern

/webui/* servlet mapping , CMBVisualizerServlet of the
com.comcast.cmb.common.controller.CMBVisualizerServlet having url pattern
/webui/cmbvisualizer/* servlet mapping, CNSUserPageServlet of the
com.comcast.cns.controller.CNSUserPageServlet servlet-class having url pattern
/webui/cnsuser/* servlet mapping, CQSUserPageServlet of the
com.comcast.cqs.controller.CQSUserPageServlet servlet-class having url pattern
/webui/cqsuser/* servlet mapping, UserLoginPageServlet of the
com.comcast.cmb.common.controller.UserLoginPageServlet servlet-class having url
pattern /webui/userlogin/* servlet mapping, UserPageServlet of the
com.comcast.cmb.common.controller.UserPageServlet servlet-class having url pattern
/webui/user/* servlet mapping, CNSSubscriptionPageServlet of the
com.comcast.cns.controller.CNSSubscriptionPageServlet servlet-class having url pattern
webui/cnsuser/subscription/* servlet-mapping, CNSPublishToTopicPageServlet of the
com.comcast.cns.controller.CNSPublishToTopicPageServlet servlet-class having url
pattern /webui/cnsuser/publish/* servlet-mapping, CNSEditTopicDisplayNamePage of
the com.comcast.cns.controller.CNSEditTopicDisplayNamePage servlet-class having url
pattern /webui/cnsuser/editdisplayname/* servlet mapping,
CNSEditTopicDeliveryPolicyPage of the
com.comcast.cns.controller.CNSEditTopicDeliveryPolicyPage servlet-class having url
pattern /webui/cnsuser/editdeliverypolicy/* servlet mapping,
CNSEditSubscriptionDeliveryPolicyPage of the
com.comcast.cns.controller.CNSEditSubscriptionDeliveryPolicyPage servlet class having
url pattern /webui/cnsuser/subscription/editdeliverypolicy/* servlet mapping,

CNSRawMessageDeliveryPolicyPage of the
com.comcast.cns.controller.CNSRawMessageDeliveryPolicyPage servlet class having url
pattern /webui/cnsuser/subscription/rawmessagedeliverypolicy/* servlet mapping,
CNSTopicPermissionPage of the com.comcast.cns.controller.CNSTopicPermissionPage
servlet class having url pattern /webui/cnsuser/permission/*,
CNSTopicAddPermissionPage of the
com.comcast.cns.controller.CNSTopicAddPermissionPage servlet class having url
pattern /webui/cnsuser/addpermission/* servlet mapping,
CQSQueueMessagesPageServlet of the
com.comcast.cqs.controller.CQSQueueMessagesPageServlet servlet class having url
pattern /webui/cqsuser/message/* servlet mapping, CQSAddQueuePermissionPage of the
com.comcast.cqs.controller.CQSAddQueuePermissionPage servlet class having url
pattern /webui/cqsuser/addpermission/* servlet mapping, CQSQueuePermissionsPage of
the com.comcast.cqs.controller.CQSQueuePermissionsPage servlet class having url
pattern /webui/cqsuser/permissions/* servlet mapping, CNSWorkerStatePageServlet of
the com.comcast.cns.controller.CNSWorkerStatePageServlet servlet class having url
pattern /webui/cnsworkerstate/* servlet mapping, CQSAPIStatePageServlet of the
com.comcast.cqs.controller.CQSAPIStatePageServlet servlet class having url pattern
/webui/cqsapistate/* servlet mapping, CQSEditQueueAttributePage of the
com.comcast.cqs.controller.CQSEditQueueAttributePage servlet class having url pattern
/webui/cqsuser/editqueueattributes/* servlet mapping and CMBStatsServlet of the
com.comcast.cmb.common.controller.CMBStatsServlet servlet class having url pattern
/webui/cmbcallstats/* servlet mapping.

See <https://github.com/Comcast/cmb/blob/master/config/WEB-INF-CNS/web.xml>,
<https://github.com/Comcast/cmb/blob/master/config/WEB-INF-CQS/web.xml> and
<https://github.com/Comcast/cmb/blob/master/WebContent/WEB-INF/web.xml>.

22. It is well known by those skilled in the art that an URL pattern registered in a web.xml table maps a request for dynamically generated information from a selected or specified servlet object of a plurality of instantiated servlet objects to a servlet class designated to handle the request.
23. Mapping a selected or specified instantiated servlet object is accomplished via matching a given servlet URL pattern contained in a request for dynamically generated information from a selected or specified servlet object to a servlet class designated to handle the request.
24. Several of said individually named servlets include Java code comprising at least one print() or println() statement of the PrintWriter method specifying an URL pattern (specified below) mapping a request for dynamically generated information to the servlet class designated to handle the request wherein said URL pattern is defined within said at least one print() or println() statement.
25. Said individually named servlets comprise a set of instantiated servlet objects, one of which is selected or specified to generate dynamically generated information via a PrintWriter available for servlet use.
26. Said selected or specified servlet object of said set of instantiated servlet objects generates dynamically generated information via said PrintWriter available for servlet use.
27. Said dynamically generated information generated by said selected or specified servlet object comprises print() or println() statements of the PrintWriter method.

28. Said dynamically generated information generated through said selected or specified servlet object comprises cloud network usage monitoring information such as performance and advertising metrics, web statistics and cost control information.
29. Said dynamically generated information generated through said selected or specified servlet object comprises at least one resource corresponding to cloud-based predetermined program material represented by program signals representative of said predetermined program material.
30. At least since Defendant Comcast received service of the original complaint on or about 11/16/15, Defendant Comcast received service of Progme's First Amended Complaint on 2/22/16, Defendant Comcast received service of Progme's Second Amended Complaint on 4/8/16 or Defendant Comcast received service of this Fourth Amended Complaint, Defendant Comcast has had knowledge of the '425 Patent-in-suit or has been willfully blind to the existence of the '425 Patent-in-suit.
31. Defendant Comcast has continued to infringe the '425 Patent after being made aware of the existence of the '425 Patent from actual notice from said service given by filing said prior and pending suits.
32. Defendant Comcast has generated and continues to generate said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system.
33. On information and belief, said program signals representative of predetermined program material transmitted via Defendant Comcast's cable television delivery system comprise program streams for the following programming services: BBC World News; beIn Sports

and beIn ~ Sports; Disney including Disney Channel, Disney Junior, Disney XD, FX and FXX; ESPN including ESPN, ESPN2, ESPN3, ESPNNews, ESPN Deportes and ESPNU; Fox including Fox News, Fox Business, Fox Sports 1 and Big Ten Network; Nat Geo including National Geographic Channel and Nat Geo Wild; NBC Sports Live Extra, NBC Sports Talk Radio, Universal Sports, NHL Network; NBCUniversal including CNBC, MSNBC, Golf Channel, Esquire TV, E!, Sprout, USA Network, Syfy, Oxygen, Bravo, Mun2 and Deportes Telemundo en Vivo; A&E Networks including A&E and History Channel; Scripps including HGTV, Food Network, Cooking Channel, Travel Channel and DIY Network and Turner Broadcasting including CNN, HLN and truTV and Starz.

34. Said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise a first attribute indicating a predetermined hyperlink address comprising a resource identifier identifying a resource in the original array position of a list in which resource identifiers uniquely identifying resources corresponding to said program signals representative of predetermined program material transmitted via Defendant Comcast's cable delivery system are arrayed and a second attribute defining predetermined printable output of said resource in the initial array position instructing a PrintWriter to print said predetermined printable output of said resource in the initial array position.
35. Said print() or println() statements of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system

comprise one or more of the following print() or println() statements of the PrintWriter method having an out parameter:

- 1) out.print("<form action=\"\" method=\"POST\">");
- 2) out.println("<td><form action=\"\" method=\"POST\"><input type='hidden' name='Url' value=\""+endpoint+"\"><input type='submit' value='Clear Cache' name='ClearCache'/></form></td>");
- 3) out.println("<td><form action=\"\" method=\"POST\"><input type='hidden' name='Url' value=\""+endpoint+"\"><input type='submit' value='Clear API Stats' name='ClearAPIStats'/></form></td>"); and
- 4) out.println("<td><form action=\"\" method=\"POST\"><input type='hidden' name='Host' value=\""+host+"\"><input type='submit' value='Remove Record' name='RemoveRecord'/></form></td>");

See <https://github.com/Comcast/cmb/blob/master/src/com/comcast/cqs/controller/CQSAPIStatePageServlet.java>.

36. Said print() or println() statements of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise one or more of the following print() or println() statements of the PrintWriter method having an out parameter:

- 1) out.println("<p></p>");

```

2) out.println("<h2 align='left'>Redis Response Time Percentiles</h2>");

   out.println("<p><img

   src='/webui/cmbvisualizer/responsetimeimg?redis=true'></p>");

3) out.println("<h2 align='left'>Cassandra Response Time Percentiles</h2>");

   out.println("<p><img

   src='/webui/cmbvisualizer/responsetimeimg?cassandra=true'></p>");

4) out.println("<p><img

   src='/webui/cmbvisualizer/responsetimeimg?ac="+ac+"></p>");

5) out.println("<h2 align='left'>API Call Mix</h2>");

   out.println("<p><img src='/webui/cmbvisualizer/callcountimg'></p>"); and

6) out.println("<h2 align='left'>API Call Distribution</h2>");

   out.println("<p><img src='/webui/cmbvisualizer/calldistributionimg'></p>");.

```

See <https://github.com/Comcast/cmb/blob/master/src/com/comcast/cmb/common/controller/CMBStatsServlet.java>.

37. Said print() or println() statements of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise one or more of the following print() or println() statements of the PrintWriter method having an out parameter:

```

1) out.print("<form action=\"/webui\" method=POST>");

2) out.println("<form action=\"/" + response.encodeURL("webui") + "\" method=POST>");

3) out.println("<td><a

href='/webui/cnsuser?userId="+user.getUserId()+">CNS</a></td>"); and

```

4) out.println("<td>CQS</td>");.

See <https://github.com/Comcast/cmb/blob/master/src/com/comcast/cmb/common/controller/AdminServlet.java>.

38. Said print() or println() statements of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise one or more of the following print() or println() statements of the PrintWriter method having an out parameter:

1) out.println("All Users" + " | ");

2) out.println("" + user.getUserName() + "'s
Topics" + " | ");

3) out.println("" + user.getUserName() + "'s
Queues" + " | ");

4) out.println("" + mainUser.getUserName()
) + "'s Topics" + " | ");

5) out.println("" + mainUser.getUserName()
) + "'s Queues" + " | ");

6) out.println("CNS Dashboard" + " | ");

```

7) out.println("<a href='/webui/cqsapistate'>CQS Dashboard</a>" + " | ");
8) out.println("<a href='/webui/cmbcallstats'>Stats</a>" + " | ");
9) out.println("<a href='/webui/cnsuser?userId="+mainUser.getUserId()+">
    Topics</a>" + " | ");
10) out.println("<a href='/webui/cqsuser?userId="+mainUser.getUserId()+">
    Queues</a>" + " | "); and
11) out.println("<a
    href='/webui/userlogin?Logout=Logout'>logout</a></td></tr></table>");.

```

See <https://github.com/Comcast/cmb/blob/master/src/com/comcast/cmb/common/controller/AdminServletBase.java>.

39. Said print() or println() statements of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise one or more of the following print() or println() statements of the PrintWriter method having an out parameter:

```

1) out.print("<form
action=\" /webui/cqsuser/permissions/?userId="+user.getUserId()+"&queueUrl="+queue
Url+"\" method=POST>");
2) out.println("<p><a href="
onclick=\"window.open('/webui/cqsuser/addpermission/?queueName="+ queueName +
"&userId="+userId+"', 'AddQueuePermission',
'location=0,menubar=0,scrollbars=0,status=0,titlebar=0,toolbar=0,height=470,width=730'
)>Add permission</a></p>");

```

3) out.println("<h5 style='text-align:center;'>ADMIN HOME");

and

4) out.println("BACK TO

QUEUE</h5>");.

See [https://github.com/Comcast/cmb/blob/master/src/com/comcast/cqs/controller/](https://github.com/Comcast/cmb/blob/master/src/com/comcast/cqs/controller/CQSQueuePermissionsPage.java)

CQSQueuePermissionsPage.java.

40. Said print() or println() statements of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise one or more of the following print() or println() statements of the PrintWriter method having an out parameter:

- 1) out.println("<tr><form action=\"'/webui/cqsuser?userId="+user.getUserId() + "\" method=POST>");
- 2) out.println("<tr><form action=\"'/webui/cqsuser?userId="+user.getUserId() + "\" method=POST>");
- 3) out.println("<tr><form action=\"'/webui/cqsuser?userId="+user.getUserId() + "\" " + "method=POST><td><input type='hidden' name='userId' value='"+ userId + "'/>");
- 4) out.println("<tr><form action=\"'/webui/cqsuser?userId="+user.getUserId() + "\" " + "method=POST><td><input type='hidden' name='userId' value='"+ userId + "'/>");
- 5) out.println("<td>Messages</td>");

- 6) `out.println("<td><a href='/webui/cqsuser/permissions?userId="+ user.getUserId() +
"&queueName="+ Util.getNameForAbsoluteQueueUrl(queueUrls.get(i)) +
">Permissions</td>");`
- 7) `out.println("<td><a href="`
`onclick=\"window.open('/webui/cqsuser/editqueueattributes?queueName="+`
`Util.getNameForAbsoluteQueueUrl(queueUrls.get(i)) + "&userId="+userId+"",`
`'EditQueueAttributes', 'height=630,width=580,toolbar=no')\">Attributes</td>");`
`and`
- 8) `out.println("<h5 style='text-align:center;'>ADMIN`
`HOME</h5>");`

See <https://github.com/Comcast/cmb/blob/master/src/com/comcast/cqs/controller/CQSUserPageServlet.java>.

41. A `print()` or `println()` statement of the `PrintWriter` method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprises the following `print()` or `println()` statement of the `PrintWriter` method having an `out` parameter:

- 1) `out.println("<td>Stats</td>");`

See <https://github.com/Comcast/cmb/blob/master/src/com/comcast/cns/controller/CNSWorkerStatePageServlet.java>.

42. Said `print()` or `println()` statements of the `PrintWriter` method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system

comprise one or more of the following print() or println() statements of the PrintWriter method having an out parameter:

- 1) out.println("<form

action=\"/\webui/cnsuser/permission/?userId="+user.getUserId()+"&topicArn="+topicArn+"\" method=POST>");
- 2) out.println("<p><a href="

onclick=\"window.open('/webui/cnsuser/addpermission/?topicArn=" + topicArn +

"&topicName=" + Util.getNameFromTopicArn(topicArn) + "&userId=" + userId + ",

'AddTopicPermission',location=0,menubar=0,scrollbars=0,status=0,titlebar=0,toolbar

=0,height=470,width=730')\">Add permission</p>");
- 3) out.println("<h5 style='text-align:center;'>ADMIN HOME");

and
- 4) out.println("BACK TO

TOPIC</h5>");.

See <https://github.com/Comcast/cmb/blob/master/src/com/comcast/cns/controller/CNSTopicPermissionPage.java>.

43. Said print() or println() statements of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise one or more of the following print() or println() statements of the PrintWriter method having an out parameter:

- 1) out.println("<form

action=\"/\webui/cnsuser/subscription/?userId="+userId+"&topicArn="+topicArn+"\"
method=POST>");
- 2) out.println("<form

action=\"/\webui/cnsuser/subscription/?userId="+user.getUserId()+"&arn="+s.getSubscriptionArn()+"&topicArn="+topicArn+"\" method=POST>");
- 3) out.println("<td>"+s.getEndpoint()+"</td>");
- 4) out.println("<td>"+s.getEndpoint()+"</td>");
- 5) out.println("<td><a href='#'

onclick=\"window.open('/webui/cnsuser/subscription/editdeliverypolicy?subscription

Arn="+ s.getSubscriptionArn() + "&userId=" + userId + "', 'EditDeliveryPolicy',

'height=630,width=580,toolbar=no')\">View/Edit Delivery Policy</td>");
- 6) out.println("<td><a href='#' onclick=\"window.open(\"' + url + \"',

'RawMessageDelivery', 'height=200,width=580,toolbar=no')\">Raw Message

Delivery</td>");
- 7) out.println("<p><a href='/webui/cnsuser/subscription/?userId="+userId+"&topicArn=

"+topicArn+"&nextToken="+response.encodeURL(listSubscriptionsByTopicResult.g

etNextToken())+"\">next ></p>");
- 8) out.println("<h5 style='text-align:center;'>ADMIN HOME");

and

9) out.println("<ahref='/webui/cnsuser?userId="+userId+"&topicArn="+topicArn+">B
ACK TO TOPIC</h5>");.

See <https://github.com/Comcast/cmb/blob/master/src/com/comcast/cns/controller/CNSSubscriptionPageServlet.java>.

44. Said print() or println() statements of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise one or more of the following print() or println() statements of the PrintWriter method having an out parameter:

1) out.println("<form id='frm1'
action=\"/webui/cqsuser/message/?userId="+userId+"&queueName="+queueName+"
\" method=POST>");

2) out.println("<form id='frm2'
action=\"/webui/cqsuser/message/?userId="+userId+"&queueName="+queueName+"
\" method=POST>");

3) out.println("<form id='formsendmessage'
action=\"/webui/cqsuser/message/?userId="+userId+"&queueName="+queueName+"
\" method=POST>");

4) out.println("<td><form
action=\"/webui/cqsuser/message/?userId="+user.getUserId()+"&queueName="+que
ueName+"&receiptHandle="+receivedMessage.getReceiptHandle()+"\"
method=POST><input type='submit' value='Delete' name='Delete'/><input
type='hidden' name='queueUrl' value='"+queueUrl+" ' /></form></td></tr>");

```

5) out.println("<a style='float:left;'
    href='/webui/cqsuser/message/?userId="+user.getUserId()+"&queueName="+queueName+"&nextHandle="+previousHandle+" ">Prev</a>");

6) out.println("<a style='float:left;'
    href='/webui/cqsuser/message/?userId="+user.getUserId()+"&queueName="+queueName+"&nextHandle="+previousHandle+" ">Prev</a>");

7) out.println("<a style='float:right;'
    href='/webui/cqsuser/message/?userId="+user.getUserId()+"&queueName="+queueName+"&prevHandle="+nextHandle+" ">Next</a>");

8) out.println("<h5 style='text-align:center;'><a href='/webui'>ADMIN HOME</a>");

and

9) out.println("<a href='/webui/cqsuser?userId="+userId+" ">BACK TO
    QUEUE</a></h5>");.

```

See <https://github.com/Comcast/cmb/blob/master/src/com/comcast/cqs/controller/CQSQueueMessagesPageServlet.java>.

45. A print() or println() statement of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprises the following print() or println() statement of the PrintWriter method having an out parameter:

```

1) out.println("<form
    action=\" /webui/cqsuser/addpermission/?queueName="+queueName+" \"
    method=POST>");.

```

See <https://github.com/Comcast/cmb/blob/master/src/com/comcast/cqs/controller/CQSAddQueuePermissionPage.java>.

46. Said print() or println() statements of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise one or more of the following print() or println() statements of the PrintWriter method having an out parameter:

- 1) out.println("<form action=\" /webui/cnsuser?userId=" + userId + "\" " +
"method=POST>");
- 2) out.println("<form action=\" /webui/cnsuser?userId=" + userId + "\" " +
"method=POST>");
- 3) out.println("<form action=\" /webui/cnsuser?userId="+userId+"\" method=POST>");
- 4) out.println("<td><a href=" +
onclick=\"window.open('/webui/cnsuser/editdisplayname?topicArn="+
t.getTopicArn() + "&userId="+userId+"', 'EditDisplayName',
'height=300,width=700,toolbar=no')\">"+(attributes.get("DisplayName") == null ?
"{unset}" : attributes.get("DisplayName"))+"</td>");
- 5) out.println("<td><a href='/webui/cnsuser/subscription?userId="+ userId +
"&topicArn=" + t.getTopicArn() + ">Subscriptions</td>");
- 6) out.println("<td><a href='/webui/cnsuser/publish?userId="+ userId + "&topicArn="+
t.getTopicArn() + "' target='_blank'>Publish</td>");
- 7) out.println("<td><a href=" +
onclick=\"window.open('/webui/cnsuser/editdeliverypolicy?topicArn="+

```

t.getTopicArn() + "&userId="+userId+", 'EditDeliveryPolicy',
'height=630,width=580,toolbar=no')\">View/Edit Topic Delivery Policy</a></td>");
8) out.println("<td><a href='/webui/cnsuser/permission?topicArn="+ t.getTopicArn() +
"&userId=" + userId + "'>Permission</a></td>");
9) out.println("<p><a
href='/webui/cnsuser?userId="+userId+"&nextToken="+response.encodeURL(listTo
picResult.getNextToken())+'>next&nbsp;&gt;</a></p>"); and
10) out.println("<h5 style='text-align:center;'><a href='/webui'>ADMIN
HOME</a></h5>");.

```

See <https://github.com/Comcast/cmb/blob/master/src/com/comcast/cns/controller/CNSUserPageServlet.java>.

47. A print() or println() statement of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprises the following print() or println() statement of the PrintWriter method having an out parameter:

```

1) out.println("<form
action=\"/webui/cnsuser/editdisplayname?topicArn="+topicArn+"\"
method=POST>");.

```

See <https://github.com/Comcast/cmb/blob/master/src/com/comcast/cns/controller/CNSEditTopicDisplayNamePage.java>.

48. A print() or println() statement of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of

predetermined program material via Defendant Comcast's cable television delivery system comprises the following print() or println() statement of the PrintWriter method having an out parameter:

```
1) out.println("<form  
    action=\"/webui/cnsuser/subscription/rawmessagedeliverypolicy?subscriptionArn="+  
    subArn+"\" method=POST>");.
```

See <https://github.com/Comcast/cmb/blob/master/src/com/comcast/cns/controller/CNSRawMessageDeliveryPolicyPage.java>.

49. By generating said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material, Defendant Comcast directly infringes the '425 Patent.
50. By encoding said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system, Defendant Comcast directly infringes the '425 Patent.

**COUNT II: DEFENDANT COMCAST'S DIRECT
INFRINGEMENT OF U.S. PATENT 8,713,425**

51. Plaintiff re-alleges paragraphs 1-17 as if fully set forth herein.
52. At least since Defendant Comcast received service of the original complaint on or about 11/16/15, Defendant Comcast received service of Progme's First Amended Complaint on 2/22/16, Defendant Comcast received service of Progme's Second Amended Complaint on 4/8/16 or Defendant Comcast received service of this Fourth Amended Complaint,

Defendant Comcast has had knowledge of the '425 Patent-in-suit or has been willfully blind to the existence of the '425 Patent-in-suit.

53. Defendant Comcast continued to infringe the '425 Patent after being made aware of the existence of the '425 Patent from actual notice from said service given by filing said prior and pending suits.
54. Defendant Comcast has generated and continues to generate said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system.
55. On information and belief, said program signals representative of predetermined program material transmitted via Defendant Comcast's cable television delivery system comprise program streams for the following programming services: BBC World News; beIn Sports and beIn ~ Sports; Disney including Disney Channel, Disney Junior, Disney XD, FX and FXX; ESPN including ESPN, ESPN2, ESPN3, ESPNNews, ESPN Deportes and ESPNU; Fox including Fox News, Fox Business, Fox Sports 1 and Big Ten Network; Nat Geo including National Geographic Channel and Nat Geo Wild; NBC Sports Live Extra, NBC Sports Talk Radio, Universal Sports, NHL Network; NBCUniversal including CNBC, MSNBC, Golf Channel, Esquire TV, E!, Sprout, USA Network, Syfy, Oxygen, Bravo, Mun2 and Deportes Telemundo en Vivo; A&E Networks including A&E and History Channel; Scripps including HGTV, Food Network, Cooking Channel, Travel Channel and DIY Network and Turner Broadcasting including CNN, HLN and truTV and Starz.
56. Said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via

Defendant Comcast's cable television delivery system comprise a first attribute indicating a predetermined hyperlink address comprising a resource identifier identifying a resource in the original array position of a list in which resource identifiers uniquely identifying resources corresponding to said program signals representative of predetermined program material transmitted via Defendant Comcast's cable delivery system are arrayed and a second attribute defining predetermined printable output of said resource in the initial array position instructing a PrintWriter to print said predetermined printable output of said resource in the initial array position.

57. By generating said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material, Defendant Comcast directly infringes the '425 Patent.
58. By encoding said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system, Defendant Comcast directly infringes the '425 Patent.

**COUNT III: DEFENDANT COMCAST'S DIRECT
INFRINGEMENT OF U.S. PATENT 8,713,425**

59. Plaintiff re-alleges paragraphs 1-17 as if fully set forth herein.
60. At least since Defendant Comcast received service of the original complaint on or about 11/16/15, Defendant Comcast received service of Progme's First Amended Complaint on 2/22/16, Defendant Comcast received service of Progme's Second Amended Complaint on 4/8/16 or Defendant Comcast received service of this Fourth Amended Complaint,

Defendants Comcast has had knowledge of the '425 Patent-in-suit or has been willfully blind to the existence of the '425 Patent-in-suit.

61. Defendant Comcast continued to infringe the '425 Patent after being made aware of the existence of the '425 Patent from actual notice from said service given by filing said prior and pending suits.
62. Defendant Comcast has generated and continues to generate said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system.
63. On information and belief, said program signals representative of predetermined program material transmitted via Defendant Comcast's cable television delivery system comprise program streams for the following programming services: BBC World News; beIn Sports and beIn ~ Sports; Disney including Disney Channel, Disney Junior, Disney XD, FX and FXX; ESPN including ESPN, ESPN2, ESPN3, ESPNNews, ESPN Deportes and ESPNU; Fox including Fox News, Fox Business, Fox Sports 1 and Big Ten Network; Nat Geo including National Geographic Channel and Nat Geo Wild; NBC Sports Live Extra, NBC Sports Talk Radio, Universal Sports, NHL Network; NBCUniversal including CNBC, MSNBC, Golf Channel, Esquire TV, E!, Sprout, USA Network, Syfy, Oxygen, Bravo, Mun2 and Deportes Telemundo en Vivo; A&E Networks including A&E and History Channel; Scripps including HGTV, Food Network, Cooking Channel, Travel Channel and DIY Network and Turner Broadcasting including CNN, HLN and truTV and Starz.
64. Said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via

Defendant Comcast's cable television delivery system comprise a first attribute indicating a predetermined hyperlink address comprising a resource identifier identifying a resource in the original array position of a list in which resource identifiers uniquely identifying resources corresponding to said program signals representative of predetermined program material transmitted via Defendant Comcast's cable delivery system are arrayed and a second attribute defining predetermined printable output of said resource in the initial array position instructing a PrintWriter to print said predetermined printable output of said resource in the initial array position.

65. Said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system are contained in a predetermined class referenced by said program signals.
66. By said program signals referencing said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system Defendant Comcast generates said print() or println() statements of the PrintWriter method.
67. By said program signals referencing said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system Defendant Comcast encodes said print() or println() statements of the PrintWriter method to be transmitted in conjunction with

program signals representative of predetermined program material via Defendant Comcast's cable television delivery system.

68. Said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprises public class HConfig.
69. Said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system has a corresponding class loader to load said predetermined class into a predetermined virtual machine processing means, means for processing program-related signals, operatively coupled to means for receiving program-related signals to process said program signals.
70. Means for processing program-related signals operatively coupled to means for receiving program-related signals then processes said print() or println() statements of the PrintWriter method in a predetermined manner. See '425 Patent, claim 14.
71. Said print() or println() statements of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise one or more of the following print() or println() statements of the PrintWriter method having an out parameter:

- 1) out.println("Found " + screens.length + " screens...");
- 2) out.println("Screen[" + i + "] " + screens[i]);

```

3) out.println("The default screen is screen[" + idx + "]");
4) out.println("Background[" + i + "]");
5) out.println("Video[" + i + "]");
6) out.println("Graphics[" + i + "]");
7) out.println(indent + port);
8) out.println(indent + TAB + "type = " + portType(port));
9) out.println(indent + TAB + "enabled = " + port.status());
10) out.println(indent + TAB + "hdcp = " +
    port.queryCapability(VideoOutputPort.CAPABILITY_TYPE_HDCP));
11) out.println(indent + TAB + "dtcp = " +
    port.queryCapability(VideoOutputPort.CAPABILITY_TYPE_DTCP));
12) out.println(indent + TAB + "restriction = " +
    port.queryCapability(VideoOutputPort.CAPABILITY_TYPE_RESOLUTION
    _ RESTRICTION));
13) out.println(indent + "BackgroundDevice[" + i + "] " + bg[i]);
14) out.println(indent + "The default bg device is BackgroundDevice[" + idx +
    "]");
15) out.println(indent + "VideoDevice[" + i + "] " + video[i]);
16) out.println(indent + "The default video device is VideoDevice[" + idx + "]");
17) out.println(indent + "GraphicsDevice[" + i + "] " + gfx[i]);
18) out.println(indent + "The default gfx device is GraphicsDevice[" + idx + "]");
19) out.println(indent + "id = " + device.getIDstring());

```

```

20) out.println(indent + "aspect ratio = " +
    aspectRatio(device.getScreenAspectRatio()));
21) out.println(indent + "The " + name + " config is config[" + idx + "]);
22) out.println(indent + "BG Config[" + i + "] " + configs[i]);
23) out.println(indent + "Video Config[" + i + "] " + configs[i]);
24) out.println(indent + "Gfx Config[" + i + "] " + configs[i]);
25) out.println(indent + "flickerFilter = " + config.getFlickerFilter());
26) out.println(indent + "interlaced = " + config.getInterlaced());
27) out.println(indent + "pixel aspect ratio = " +
    aspectRatio(config.getPixelAspectRatio()));
28) out.println(indent + "resolution = " + resolution(config.getPixelResolution()));
29) out.println(indent + "screenArea = " + area(config.getScreenArea()));
30) out.println(indent + "color = " + bgConfig.getColor()); and
31) out.println(indent + "still = supported");.

```

See https://community.cablelabs.com/svn/OCAPRI/trunk/ri/RI_Stack/apps/config/org/cablelabs/xlet/config/HConfig.java.

72. By generating said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material, Defendant Comcast directly infringes the '425 Patent.
73. By encoding said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system, Defendant Comcast directly infringes the '425 Patent.

**COUNT IV: DEFENDANT COMCAST'S DIRECT
INFRINGEMENT OF U.S. PATENT 8,713,425**

74. Plaintiff re-alleges paragraphs 1-17 as if fully set forth herein.
75. At least since Defendant Comcast received service of the original complaint on or about 11/16/15, Defendant Comcast received service of Progme's First Amended Complaint on 2/22/16, Defendant Comcast received service of Progme's Second Amended Complaint on 4/8/16 or Defendant Comcast received service of this Fourth Amended Complaint, Defendants Comcast has had knowledge of the '425 Patent-in-suit or has been willfully blind to the existence of the '425 Patent-in-suit.
76. Defendant Comcast continued to infringe the '425 Patent after being made aware of the existence of the '425 Patent from actual notice from said service given by filing said prior and pending suits.
77. Defendant Comcast has generated and continues to generate said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system.
78. On information and belief, said program signals representative of predetermined program material transmitted via Defendant Comcast's cable television delivery system comprise program streams for the following programming services: BBC World News; beIn Sports and beIn ~ Sports; Disney including Disney Channel, Disney Junior, Disney XD, FX and FXX; ESPN including ESPN, ESPN2, ESPN3, ESPNNews, ESPN Deportes and ESPNU; Fox including Fox News, Fox Business, Fox Sports 1 and Big Ten Network; Nat Geo including National Geographic Channel and Nat Geo Wild; NBC Sports Live Extra, NBC

Sports Talk Radio, Universal Sports, NHL Network; NBCUniversal including CNBC, MSNBC, Golf Channel, Esquire TV, E!, Sprout, USA Network, Syfy, Oxygen, Bravo, Mun2 and Deportes Telemundo en Vivo; A&E Networks including A&E and History Channel; Scripps including HGTV, Food Network, Cooking Channel, Travel Channel and DIY Network and Turner Broadcasting including CNN, HLN and truTV and Starz.

79. Said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise a first attribute indicating a predetermined hyperlink address comprising a resource identifier identifying a resource in the original array position of a list in which resource identifiers uniquely identifying resources corresponding to said program signals representative of predetermined program material transmitted via Defendant Comcast's cable delivery system are arrayed and a second attribute defining predetermined printable output of said resource in the initial array position instructing a PrintWriter to print said predetermined printable output of said resource in the initial array position.
80. Said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system are contained in a predetermined class referenced by said program signals.
81. By said program signals referencing said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant

Comcast's cable television delivery system Defendant Comcast generates said print() or println() statements of the PrintWriter method.

82. By said program signals referencing said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system Defendant Comcast encodes said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system.
83. Said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprises a predetermined jdwpGen class.
84. Said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system has a corresponding class loader to load said predetermined class into a predetermined virtual machine processing means, means for processing program-related signals, operatively coupled to means for receiving program-related signals to process said program signals.
85. Means for processing program-related signals operatively coupled to means for receiving program-related signals then processes said print() or println() statements of the PrintWriter method in a predetermined manner. See '425 Patent, claim 14.

86. Said print() or println() statements of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise one or more of the following print() or println() statements of the PrintWriter method having a writer parameter:

AbstractCommandNode

- 1) writer.println("<h5>\" + name +
\" Command (\" + nameNode.value() + \"</h5>");
- 2) writer.print(" "); and
- 3) writer.println(name() + " (\" + nameNode.value() + \"")");.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/AbstractCommandNode.java?p=20423.

AbstractGroupNode

- 1) writer.println("void write(PacketStream ps) {");
- 2) writer.print(" a" + name());
- 3) writer.println(writeLabel + ".write(ps);"); and
- 4) writer.println("(vm, ps);");.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/AbstractGroupNode.java?p=20423.

AbstractNamedNode

- 1) writer.println("<h4>\" + name +

" Command Set</h4>");

2) writer.print("class " + javaClassName());

3) writer.println(javaClassImplements() + " {}"); and

4) writer.println("#define " + context.whereC + " " + nameNode.value());.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/AbstractNamedNode.java?p=20423.

AbstractTypeListNode

1) writer.printl

2) writer.println(className + "(VirtualMachineImpl vm, PacketStream ps) {}");

3) writer.println(className + "(" + javaParams() + ") {}"); and

4) writer.println("this." + tn.name() + " = " + tn.name() + ";");.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/AbstractTypeListNode.java?p=20423.

AbstractTypeNode

1) writer.println("<td colspan=" + (maxStructIndent - structIndent) + ">");

2) writer.println(docType() + "<td><i>" + name() + "</i><td>" + comment() + " "); and

3) writer.print(" " + name);.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/AbstractTypeNode.java?p=20423.

AltNode

- 1) writer.println("<td colspan=" + (maxStructIndent - structIndent + 1) + ">");
- 2) writer.println("Case " + nameNode.name + " - if <i>" +
((SelectNode)parent).typeName.name + "</i> is " + nameNode.value() + ":",");
- 3) writer.print("static final " + select.typeNode.javaType());
- 4) writer.println(" ALT_ID = " + nameNode.value() + ":",");
- 5) writer.println(select.typeNode.javaParam() + "() {");
- 6) writer.println("return ALT_ID;");
- 7) writer.println("case " + nameNode.value() + ":",");
- 8) writer.println(common + " = new " + name + "(vm, ps);");
- 9) writer.print("static " + select.name() + " create(");
- 10) writer.print(javaParams());
- 11) writer.print("return new " + select.name() + "(");
- 12) writer.print("ALT_ID, new " + javaClassName() + "("); and
- 13) writer.print(tn.name());.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/AltNode.java?p=20423.

BooleanTypeNode

- 1) writer.println("ps.writeBoolean(" + writeLabel + "):");.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/BooleanTypeNode.java?p=20423.

ByteTypeNode

1) `writer.println("ps.writeByte(" + writeLabel + ");");`.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/ByteTypeNode.java?p=20423.

CommandNode

1) `writer.println("static final int COMMAND = " + nameNode.value() + ");");`.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/CommandNode.java?p=20423.

CommandSetNode

1) `writer.println("<h4>\" + name +
\" Command Set (" + nameNode.value() + ")</h4>");`

2) `writer.print("");`

3) `writer.println(name() + " Command Set (" + nameNode.value() + ")");`

4) `writer.println("static final int COMMAND_SET = " + nameNode.value() + ");");` and

5) `writer.println("private " + name() + "() {} // hide constructor");`.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/CommandSetNode.java?p=20423.

ConstantNode

1) `writer.println("static final int " + name + " = " + nameNode.value() + ");");` and

2) `writer.println("<tr><td>\" + name + "<td>\" + nameNode.value() +
\"<td>\" + comment() + " ");`.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/ConstantNode.java?p=20423.

ConstantSetNode

- 1) `writer.println("<h4>\" + name +
\" Constants</h4>");`
- 2) `writer.println("");`
- 3) `writer.print("");` and
- 4) `writer.println(name() + " Constants");`;

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/ConstantSetNode.java?p=20423.

ErrorNode

- 1) `writer.println("<tr><td>\" + "<a href=\"\" + NAME_OF_ERROR_TABLE + \"_\" +
name + \"\">\" + name + "</td>\" + "<td>\" + com + " </td></tr>");`;

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/ErrorNode.java?p=20423.

ErrorSetNode

- 1) `writer.println("<dt>\" + "Error Data");`;

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/ErrorSetNode.java?p=20423.

FieldTypeNode

- 1) `writer.println("ps.writeFieldRef(\" + writeLabel + \");");`;

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/FieldTypeNode.java?p=20423.

FrameTypeNode

1) `writer.println("ps.writeFrameRef(" + writeLabel + ");");`;

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/FrameTypeNode.java?p=20423.

IntTypeNode

1) `writer.println("ps.writeInt(" + writeLabel + ");");`;

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/IntTypeNode.java?p=20423.

LocationTypeNode

1) `writer.println("ps.writeLocation(" + writeLabel + ");");`;

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/LocationTypeNode.java?p=20423.

LongTypeNode

1) `writer.println("ps.writeLong(" + writeLabel + ");");`;

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/LongTypeNode.java?p=20423.

MethodTypeNode

1) `writer.println("ps.writeMethodRef(" + writeLabel + ");");`;

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/MethodTypeNode.java?p=20423.

Node

1) `writer.println("if ((ps.vm.traceFlags & VirtualMachineImpl.TRACE_SENDS)`

```

    != 0) {");

2) writer.print("ps.vm.printTrace(\"Sending: ");

3) writer.print(writeLabel + "(" + javaType() + "): \" + ");

4) writer.println(displayValue + ");");

5) writer.println("if (vm.traceReceives) {");

6) writer.print("vm.printReceiveTrace(" + depth + ", \"");

7) writer.print(readLabel + "(" + javaType() + "): \" + ");

8) writer.println(displayValue + ");");

```

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/Node.java?p=20423.

OutNode

```

1) writer.print("static " + cmdName + " process(VirtualMachineImpl vm");

2) writer.print(tn.javaParam());

3) writer.println("throws JDWPException {");

4) writer.print("PacketStream ps = enqueueCommand(vm");

5) writer.print(tn.name());

6) writer.println("return waitForReply(vm, ps);");

7) writer.print("static PacketStream enqueueCommand(VirtualMachineImpl vm");

8) writer.print(tn.javaParam());

9) writer.println("PacketStream ps = new PacketStream(vm, COMMAND_SET,

    COMMAND);");

10) writer.println("if ((vm.traceFlags & vm.TRACE_SENDS) != 0) {");

11) writer.print("vm.printTrace(\"Sending Command(id=\" + ps.pkt.id + \") ");

```



```

12) writer.print(parent.context.whereJava);

13) writer.println("\n+(ps.pkt.flags!=0?\n, FLAGS=\n + ps.pkt.flags:\n\n));");

14) writer.println("ps.send();");

15) writer.println("return ps;");

16) writer.println("static " + cmdName + " waitForReply(VirtualMachineImpl vm, " +
    "PacketStream ps)");

17) writer.println("throws JDWPException {");

18) writer.println("ps.waitForReply();"); and

19) writer.println("return new " + cmdName + "(vm, ps);");.

```

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/OutNode.java?p=20423.

ReferenceIDTypeNode

```

1) writer.println("ps.writeClassRef(" + writeLabel + ");");.

```

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/ReferenceIDTypeNode.java?p=20423.

ReferenceTypeNode

```

1) writer.println("ps.writeClassRef(" + writeLabel + ".ref());");.

```

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/ReferenceTypeNode.java?p=20423.

RepeatNode

```

1) writer.println("<td colspan=" + (maxStructIndent - structIndent) + ">");

```

- 2) `writer.println("int<td><i>" + name + "</i><td>" + comment() + " ");`
- 3) `writer.println("<td colspan=" + (maxStructIndent - structIndent + 2) + ">");`
- 4) `writer.println("Repeated <i>" + name + "</i> times:");`
- 5) `writer.println("ps.writeInt(" + writeLabel + ".length);");`
- 6) `writer.println("for (int i = 0; i < " + writeLabel + ".length; i++) {");`
- 7) `writer.println("int " + cntLbl + " = ps.readInt());");`
- 8) `writer.println(readLabel + " = new " + member.javaType() +
"[" + cntLbl + "]); and`
- 9) `writer.println("for (int i = 0; i < " + cntLbl + "; i++) {");`

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/RepeatNode.java?p=20423.

ReplyNode

- 1) `writer.println("if (vm.traceReceives) {");`
- 2) `writer.print("vm.printTrace(\"Receiving Command(id=\" + ps.pkt.id + \") ");`
- 3) `writer.print(parent.context.whereJava);`
- 4) `writer.print("(ps.pkt.flags!=0?\", FLAGS=\" + ps.pkt.flags:\""); and`
- 5) `writer.print("(ps.pkt.errorCode!=0?\", ERROR CODE=\" +
ps.pkt.errorCode:\"");`

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/ReplyNode.java?p=20423.

RootNode

- 1) `writer.println("<html><head><title>" + comment() + "</title></head>");`
- 2) `writer.println("package com.sun.tools.jdi;");`

- 3) `writer.println("import com.sun.jdi.*;");` and
- 4) `writer.println("import java.util.*;");`.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/RootNode.java?p=20423.

SelectNode

- 1) `writer.println("abstract static class " + commonBaseClass() + " {");`
- 2) `writer.println("abstract void write(PacketStream ps);");`
- 3) `writer.println("abstract " + typeNode.javaParam() + "()");`
- 4) `writer.println(commonBaseClass() + commonVar() + ";");`
- 5) `writer.print(className + "(" + typeNode.javaParam() + ", ");`
- 6) `writer.print(commonBaseClass() + commonVar());`
- 7) `writer.println("this." + typeNode.name() + " = " + typeNode.name() + ";");`
- 8) `writer.println("this." + commonVar() + " = " + commonVar() + ";");`
- 9) `writer.println(commonVar() + ".write(ps);");` and
- 10) `writer.println("switch (" + typeNode.name() + ") {");`.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/SelectNode.java?p=20423.

StringTypeNode

- 1) `writer.println("ps.writeString(" + writeLabel + ");");`.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/StringTypeNode.java?p=20423.

UntaggedValueTypeNode

- 1) `writer.println("ps.writeUntaggedValue(" + writeLabel + ");");`.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/UntaggedValueTypeName.java?p=20423.

ValueTypeName

1) writer.println("ps.writeValue(" + writeLabel + ");");

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/ValueTypeName.java?p=20423.

See https://community.cablelabs.com/svn/OCAPRI/tags/stable_ctp_no_upnp/ri/ODLSrc/OCAP-1.0/jvm/Sun/src/share/tools/jpda/classes/com/sun/tools/jdwpngen/?p=20423.

87. By generating said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material, Defendant Comcast directly infringes the '425 Patent.
88. By encoding said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system, Defendant Comcast directly infringes the '425 Patent.

**COUNT V: DEFENDANT COMCAST'S DIRECT
INFRINGEMENT OF U.S. PATENT 8,713,425**

89. Plaintiff re-alleges paragraphs 1-17 as if fully set forth herein.
90. At least since Defendant Comcast received service of the original complaint on or about 11/16/15, Defendant Comcast received service of Progme's First Amended Complaint on 2/22/16, Defendant Comcast received service of Progme's Second Amended Complaint on 4/8/16 or Defendant Comcast received service of this Fourth Amended Complaint,

Defendants Comcast has had knowledge of the '425 Patent-in-suit or has been willfully blind to the existence of the '425 Patent-in-suit.

91. Defendant Comcast continued to infringe the '425 Patent after being made aware of the existence of the '425 Patent from actual notice from said service given by filing said prior and pending suits.
92. Defendant Comcast has generated and continues to generate said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system.
93. On information and belief, said program signals representative of predetermined program material transmitted via Defendant Comcast's cable television delivery system comprise program streams for the following programming services: BBC World News; beIn Sports and beIn ~ Sports; Disney including Disney Channel, Disney Junior, Disney XD, FX and FXX; ESPN including ESPN, ESPN2, ESPN3, ESPNNews, ESPN Deportes and ESPNU; Fox including Fox News, Fox Business, Fox Sports 1 and Big Ten Network; Nat Geo including National Geographic Channel and Nat Geo Wild; NBC Sports Live Extra, NBC Sports Talk Radio, Universal Sports, NHL Network; NBCUniversal including CNBC, MSNBC, Golf Channel, Esquire TV, E!, Sprout, USA Network, Syfy, Oxygen, Bravo, Mun2 and Deportes Telemundo en Vivo; A&E Networks including A&E and History Channel; Scripps including HGTV, Food Network, Cooking Channel, Travel Channel and DIY Network and Turner Broadcasting including CNN, HLN and truTV and Starz.
94. Said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via

Defendant Comcast's cable television delivery system comprise a first attribute indicating a predetermined hyperlink address comprising a resource identifier identifying a resource in the original array position of a list in which resource identifiers uniquely identifying resources corresponding to said program signals representative of predetermined program material transmitted via Defendant Comcast's cable delivery system are arrayed and a second attribute defining predetermined printable output of said resource in the initial array position instructing a PrintWriter to print said predetermined printable output of said resource in the initial array position.

95. Said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system are contained in a predetermined class referenced by said program signals.
96. By said program signals referencing said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system Defendant Comcast generates said print() or println() statements of the PrintWriter method.
97. By said program signals referencing said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system Defendant Comcast encodes said print() or println() statements of the PrintWriter method to be transmitted in conjunction with

program signals representative of predetermined program material via Defendant Comcast's cable television delivery system.

98. Said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprises public class MC.
99. Said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system has a corresponding class loader to load said predetermined class into a predetermined virtual machine processing means, means for processing program-related signals, operatively coupled to means for receiving program-related signals to process said program signals.
100. Means for processing program-related signals operatively coupled to means for receiving program-related signals then processes said print() or println() statements of the PrintWriter method in a predetermined manner. See '425 Patent, claim 14.
101. Said print() or println() statements of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise one or more of the following print() or println() statements of the PrintWriter method having an pw parameter:

- 1) pw.printMsg("package @ ;", packageName);
- 2) pw.printMsg("public class @ extends LogWrapperBase {", className);

```

3) pw.printMsg("public @( Logger logger )", className);

4) pw.println( "super( logger ) ;");

5) pw.printMsg("// Log wrapper class for Sun private system exceptions in group @",
    groupName);

6) pw.printMsg("// Generated by MC.java version @, DO NOT EDIT BY HAND!",
    VERSION);

7) pw.printMsg("// Generated from input file @ on @", inFile, new Date());

8) pw.println("import org.omg.CORBA." + e.getName() + " ;");

9) pw.println( "private static LogWrapperFactory factory = new
    LogWrapperFactory() {");

10) pw.println( "public LogWrapperBase create( Logger logger )" );

11) pw.printMsg("return new @( logger ) ;", className);

12) pw.printMsg("public static @ get( ORB orb, String logDomain )", className);

13) pw.printMsg( "@ wrapper = ", className);

14) pw.printMsg( "(@) orb.getLogWrapper( logDomain, ", className);

15) pw.printMsg( "\"@\"", factory ) ;", groupName);

16) pw.println( "return wrapper ;" );

17) pw.printMsg( "public static @ get( String logDomain )", className);

18) pw.printMsg( "@ wrapper = ", className);

19) pw.printMsg( "(@) ORB.staticGetLogWrapper( logDomain, ", className);

20) pw.printMsg( "\"@\"", factory ) ;", groupName);

21) pw.println( "return wrapper ;" );

22) pw.printMsg("// @", e.getName());

```



```

23) pw.printMsg("public static final int @ = @ ;", errorName, getBase(groupName,
    code));
24) pw.printMsg( "public @ @( CompletionStatus cs, Throwable t@) {",
    exceptionName, ident, makeDeclArgs(true, numParams));
25) pw.printMsg( "@ exc = new @( @, cs );", exceptionName, exceptionName,
    errorName);
26) pw.println( "exc.initCause( t ) ;" );
27) pw.printMsg( "if (logger.isLoggable( Level.@ )) {", logLevel);
28) pw.printMsg( "Object[] parameters = new Object[@] ;", numParams);
29) pw.printMsg("parameters[@] = arg@ ;", a, a);
30) pw.println( "Object[] parameters = null ;");
31) pw.printMsg( "doLog( Level.@, \"@.@\",", logLevel, groupName, ident);
32) pw.printMsg( "parameters, @.class, exc ) ;", className);
33) pw.println( "return exc ;");
34) pw.printMsg("public @ @( CompletionStatus cs@) {", exceptionName, ident,
    makeDeclArgs(true, numParams));
35) pw.printMsg("return @( cs, null@ ) ;", ident, makeCallArgs(true, numParams));
36) pw.printMsg("public @ @( Throwable t@) {", exceptionName, ident,
    makeDeclArgs(true, numParams));
37) pw.printMsg("return @( CompletionStatus.COMPLETED_NO, t@ ) ;", ident,
    makeCallArgs(true, numParams));
38) pw.printMsg("public @ @( @) {", exceptionName, ident, makeDeclArgs(false,
    numParams));

```

```
39) pw.printMsg("return @( CompletionStatus.COMPLETED_NO, null@ );", ident,  
    makeCallArgs(true, numParams)); and  
40) pw.printMsg("@.@=\"@: (@) @\"", groupName, ident,  
    getMessageID(groupName, exName, c.getCode()), exName, c.getMessage());.
```

See <http://www.docjar.com/html/api/com/sun/tools/corba/se/logutil/MC.java.html>.

102. By generating said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material, Defendant Comcast directly infringes the '425 Patent.

103. By encoding said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system, Defendant Comcast directly infringes the '425 Patent.

**COUNT VI: DEFENDANT COMCAST'S DIRECT
INFRINGEMENT OF U.S. PATENT 8,713,425**

104. Plaintiff re-alleges paragraphs 1-17 as if fully set forth herein.

105. At least since Defendant Comcast received service of the original complaint on or about 11/16/15, Defendant Comcast received service of Progme's First Amended Complaint on 2/22/16, Defendant Comcast received service of Progme's Second Amended Complaint on 4/8/16 or Defendant Comcast received service of this Fourth Amended Complaint, Defendants Comcast has had knowledge of the '425 Patent-in-suit or has been willfully blind to the existence of the '425 Patent-in-suit.

106. Defendant Comcast continued to infringe the '425 Patent after being made aware of the existence of the '425 Patent from actual notice from said service given by filing said prior and pending suits.
107. Defendant Comcast has generated and continues to generate said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system.
108. On information and belief, said program signals representative of predetermined program material transmitted via Defendant Comcast's cable television delivery system comprise program streams for the following programming services: BBC World News; beIn Sports and beIn ~ Sports; Disney including Disney Channel, Disney Junior, Disney XD, FX and FXX; ESPN including ESPN, ESPN2, ESPN3, ESPNNews, ESPN Deportes and ESPNU; Fox including Fox News, Fox Business, Fox Sports 1 and Big Ten Network; Nat Geo including National Geographic Channel and Nat Geo Wild; NBC Sports Live Extra, NBC Sports Talk Radio, Universal Sports, NHL Network; NBCUniversal including CNBC, MSNBC, Golf Channel, Esquire TV, E!, Sprout, USA Network, Syfy, Oxygen, Bravo, Mun2 and Deportes Telemundo en Vivo; A&E Networks including A&E and History Channel; Scripps including HGTV, Food Network, Cooking Channel, Travel Channel and DIY Network and Turner Broadcasting including CNN, HLN and truTV and Starz.
109. Said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise a first attribute indicating a predetermined hyperlink address comprising a resource identifier identifying a resource

in the original array position of a list in which resource identifiers uniquely identifying resources corresponding to said program signals representative of predetermined program material transmitted via Defendant Comcast's cable delivery system are arrayed and a second attribute defining predetermined printable output of said resource in the initial array position instructing a `PrintWriter` to print said predetermined printable output of said resource in the initial array position.

110. Said `print()` or `println()` statements of the `PrintWriter` method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system are contained in a predetermined class referenced by said program signals.
111. By said program signals referencing said predetermined class containing said `print()` or `println()` statements of the `PrintWriter` method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system Defendant Comcast generates said `print()` or `println()` statements of the `PrintWriter` method.
112. By said program signals referencing said predetermined class containing said `print()` or `println()` statements of the `PrintWriter` method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system Defendant Comcast encodes said `print()` or `println()` statements of the `PrintWriter` method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system.

113. Said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprises a predetermined upnp Home Network class.
114. Said predetermined class containing said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system has a corresponding class loader to load said predetermined class into a predetermined virtual machine processing means, means for processing program-related signals, operatively coupled to means for receiving program-related signals to process said program signals.
115. Means for processing program-related signals operatively coupled to means for receiving program-related signals then processes said print() or println() statements of the PrintWriter method in a predetermined manner. See '425 Patent, claim 14.
116. Said print() or println() statements of the PrintWriter method generated by Defendant Comcast to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system comprise one or more of the following print() or println() statements of the PrintWriter method having an ps parameter:

ContainerNode

- 1) ps.print(" " + ContainerNode.SEARCHABLE + "=\"");
- 2) ps.print(XML.escapeXMLChars(getProperties().getProperty(ContainerNode.SEARCHABLE).getPropertyValue()) + "\"");

```

3) ps.print(" " + ContainerNode.CHILDCOUNT + "=\"" );
4) ps.print(XML.escapeXMLChars( Integer.toString(getReferences().length)) + "\"");
5) ps.print("<" + Node.TITLE + ">");
6) ps.print(getProperties().getProperty(Node.TITLE).getPropertyValue());
7) ps.println("</" + Node.TITLE + ">");
8) ps.print("<" + Node.UPNPCLASS + ">");
9) ps.print(getProperties().getProperty(Node.UPNPCLASS).getPropertyValue());
10) ps.println("</" + Node.UPNPCLASS + ">");
11) ps.print("<" + Node.OCAP_PERMISSION + ">");
12) ps.print(getProperties().getProperty(Node.OCAP_PERMISSION).getPropertyValue());
13) ps.println("</" + Node.OCAP_PERMISSION + ">"); and
14) ps.println("</" + getName() + ">");.

```

See https://community.cablelabs.com/svn/OCAPRI/tags/hn_down_merged_via_copy/ri/

ODLSrc/OCAP-1.0/java/src/hn/org/cablelabs/impl/ocap/hn/contentdatabase/

ContainerNode.java.

ItemNode

```

1) ps.print("<" + ItemNode.DATE + ">");
2) ps.print(date);
3) ps.println("</" + ItemNode.DATE + ">");
4) ps.print("<" + ItemNode.RCILIST + ">");
5) ps.print(rciList);
6) ps.println("</" + ItemNode.RCILIST + ">");

```

```

7) ps.print("<" + ItemNode.RESOURCE);
8) ps.print(" " + ItemNode.PROTOCOLINFO + "=\"");
9) ps.print(getProperties().getProperty(ItemNode.PROTOCOLINFO).
    getPropertyValue() + "\"");
10) ps.print(" " + ItemNode.SIZE + "=\"");
11) ps.print(getProperties().getProperty(ItemNode.SIZE).getPropertyValue() + "\"");
12) ps.print(getProperties().getProperty(ItemNode.URL).getPropertyValue());
13) ps.println("</" + ItemNode.RESOURCE + ">");
14) ps.print("<" + VideoItem.SRSID + ">");
15) ps.print(getProperties().getProperty(VideoItem.SRSID).getPropertyValue());
16) ps.println("</" + VideoItem.SRSID + ">"); and
17) ps.println("</" + getName() + ">");.

```

See https://community.cablelabs.com/svn/OCAPRI/tags/hn_down_merged_via_copy/ri/ODLsrc/OCAP-1.0/java/src/hn/org/cablelabs/impl/ocap/hn/contentdatabase/ItemNode.java.

Node

```

1) ps.print("<" + getName());
2) ps.print(" " + Node.ID + "=\"");
3) ps.print(XML.escapeXMLChars(getProperties().getProperty(Node.ID).getProperty
    Value()) + "\"");
4) ps.print(" " + Node.PARENTID + "=\"");
5) ps.print(XML.escapeXMLChars(getProperties().getProperty(Node.PARENTID).getP
    ropertyValue()) + "\"");
6) ps.print(" " + Node.RESTRICTED + "=\"");

```

```

7) ps.print(XML.escapeXMLChars(getProperties().getProperty(Node.RESTRICTED).g
    etPropertyValue() + "\"");

8) ps.print("<" + Node.TITLE + ">");

9) ps.print(getProperties().getProperty(Node.TITLE).getPropertyValue());

10) ps.println("</" + Node.TITLE + ">");

11) ps.print("<" + Node.UPNPCLASS + ">");

12) ps.print(getProperties().getProperty(Node.UPNPCLASS).getPropertyValue());

13) ps.println("</" + Node.UPNPCLASS + ">");

14) ps.print("<" + Node.OCAP_PERMISSION + ">");

15) ps.print(getProperties().getProperty(Node.OCAP_PERMISSION).
    getPropertyValue());

16) ps.println("</" + Node.OCAP_PERMISSION + ">"); and

17) ps.println("</" + getName() + ">");.

```

See https://community.cablelabs.com/svn/OCAPRI/tags/hn_down_merged_via_copy/ri/ODLSrc/OCAP-1.0/java/src/hn/org/cablelabs/impl/ocap/hn/contentdatabase/Node.java.

UPNP Home Network Device, Service & Icon Discovery

```

1) ps.println("deviceType = " + getDeviceType());

2) ps.println("friendlyName = " + getFriendlyName());

3) ps.println("presentationURL = " + getPresentationURL());

4) ps.println("devList = " + devList.size());

5) ps.println("serviceList = " + serviceList.size()); and

6) ps.println("iconList = " + iconList.size());.

```


See <https://github.com/cybergarage/cybergarage-upnp/blob/master/core/src/main/java/org/cybergarage/upnp/Device.java>.

VideoItem

- 1) ps.print("<" + VideoItem.TASKID + ">");
- 2) ps.print(getProperties().getProperty(VideoItem.TASKID).getPropertyValue());
- 3) ps.println("</" + VideoItem.TASKID + ">");
- 4) ps.print("<" + VideoItem.TASK_STATE + ">");
- 5) ps.print(getProperties().getProperty(VideoItem.TASK_STATE).getPropertyValue());
- 6) ps.println("</" + VideoItem.TASK_STATE + ">");
- 7) ps.print("<" + VideoItem.SCHED_START_DATE + ">");
- 8) ps.print(getProperties().getProperty(VideoItem.SCHED_START_DATE).getPropertyValue());
- 9) ps.println("</" + VideoItem.SCHED_START_DATE + ">");
- 10) ps.print("<" + VideoItem.SCHED_DURATION + ">");
- 11) ps.print(getProperties().getProperty(VideoItem.SCHED_DURATION).getPropertyValue());
- 12) ps.print("</" + VideoItem.SCHED_DURATION + ">");
- 13) ps.print("<" + VideoItem.SCHED_CH_ID + ">");
- 14) ps.print(getProperties().getProperty(VideoItem.SCHED_CH_ID).getPropertyValue());
- 15) ps.print("</" + VideoItem.SCHED_CH_ID + ">");
- 16) ps.print("<" + VideoItem.DESTINATION + ">");
- 17) ps.print(getProperties().getProperty(VideoItem.DESTINATION).

```

        getPropertyValue());

18) ps.print("</" + VideoItem.DESTINATION + ">");

19) ps.print("<" + VideoItem.PRI_FLAG + ">");

20) ps.print(getProperties().getProperty(VideoItem.PRI_FLAG).getPropertyValue());

21) ps.print("</" + VideoItem.PRI_FLAG + ">");

22) ps.print("<" + VideoItem.RETEN_PRI + ">");

23) ps.print(getProperties().getProperty(VideoItem.RETEN_PRI).getPropertyValue());

24) ps.print("</" + VideoItem.RETEN_PRI + ">");

25) ps.print("<" + Node.OCAP_PERMISSION + ">");

26) ps.print(getProperties().getProperty(Node.OCAP_PERMISSION).

        getPropertyValue());

27) ps.print("</" + Node.OCAP_PERMISSION + ">");

28) ps.print("<" + VideoItem.ORG_STRING + ">");

29) ps.print(getProperties().getProperty(VideoItem.ORG_STRING).getPropertyValue());

30) ps.print("</" + VideoItem.ORG_STRING + ">");

31) ps.print("<" + VideoItem.APPID + ">");

32) ps.print(getProperties().getProperty(VideoItem.APPID).getPropertyValue());

33) ps.print("</" + VideoItem.APPID + ">");

34) ps.print("<" + VideoItem.ORGID + ">");

35) ps.print(getProperties().getProperty(VideoItem.ORGID).getPropertyValue());

36) ps.print("</" + VideoItem.ORGID + ">");

37) ps.print("<" + VideoItem.SPACE_REQ + ">");

38) ps.print(getProperties().getProperty(VideoItem.SPACE_REQ).getPropertyValue());

```

```

39) ps.print("</" + VideoItem.SPACE_REQ + ">");
40) ps.print("<" + VideoItem.CONTENT_URI + ">");
41) ps.print(getProperties().getProperty(VideoItem.CONTENT_URI).
    getPropertyValue());
42) ps.print("</" + VideoItem.CONTENT_URI + ">");
43) ps.print("<" + VideoItem.MEDIA_PRES_POINT + ">");
44) ps.print(getProperties().getProperty(VideoItem.MEDIA_PRES_POINT).getProperty
    Value());
45) ps.print("</" + VideoItem.MEDIA_PRES_POINT + ">");
46) ps.print("<" + VideoItem.MSO_CONTENT_INDICATOR + ">");
47) ps.print(getProperties().getProperty(VideoItem.MSO_CONTENT_INDICATOR).get
    PropertyValue());
48) ps.print("</" + VideoItem.MSO_CONTENT_INDICATOR + ">");
49) ps.print("<" + VideoItem.EXP_PERIOD + ">");
50) ps.print(getProperties().getProperty(VideoItem.EXP_PERIOD).getPropertyValue());
51) ps.print("</" + VideoItem.EXP_PERIOD + ">");
52) ps.print("<" + VideoItem.MEDIA_STOR_VOL + ">");
53) ps.print(getProperties().getProperty(VideoItem.MEDIA_STOR_VOL).
    getPropertyValue());
54) ps.print("</" + VideoItem.MEDIA_STOR_VOL + ">"); and
55) ps.println("</" + getName() + ">");.

```

See https://community.cablelabs.com/svn/OCAPRI/tags/RI_I1_1_3_REL_B/ri/ODLSrc/OCAP-1.0/java/src/hn/org/cablelabs/impl/ocap/hn/contentdatabase/VideoItem.java.

117. By generating said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material, Defendant Comcast directly infringes the '425 Patent.

118. By encoding said print() or println() statements of the PrintWriter method to be transmitted in conjunction with program signals representative of predetermined program material via Defendant Comcast's cable television delivery system, Defendant Comcast directly infringes the '425 Patent.

**COUNT VII: DEFENDANT COMCAST'S
INFRINGEMENT OF U.S. PATENT 8,713,425**

119. Plaintiff re-alleges paragraphs 1-17 as if fully set forth herein.

120. At least since Defendant Comcast received service of the original complaint on or about 11/16/15, Defendant Comcast received service of Progme's First Amended Complaint on 2/22/16, Defendant Comcast received service of Progme's Second Amended Complaint on 4/8/16 or Defendant Comcast received service of this Fourth Amended Complaint, Defendant Comcast has had knowledge of the '425 Patent-in-suit or has been willfully blind to the existence of the '425 Patent-in-suit.

121. Defendant Comcast continued to infringe the '425 Patent after being made aware of the existence of the '425 Patent from actual notice from said service given by filing said prior and pending suits.

122. On information and belief, Defendant Comcast has directly infringed one or more of claims 14-25 of the '425 Patent by making, using (including using for testing, debugging and diagnosis purposes), importing, offering for sale and/or selling within the United States the Accused Instrumentalities specified below in violation of 35 U.S.C. § 271(a).

123. On information and belief, said Accused Instrumentalities comprise an apparatus as disclosed and claimed in the '425 Patent for receiving an hyperlink address string structured as a PrintWriter method in conjunction with predetermined program material and processing A) a predetermined hyperlink address comprising said resource identifier to hyperlink to said resource in the initial array position of said list in which resource identifiers uniquely identifying resources corresponding to predetermined program material are arrayed and B) a parameter defining predetermined printable output of said resource in an initial array position instructing a PrintWriter to print predetermined printable output of said resource in the initial array position indicated in a second attribute of said hyperlink address string. See the '425 Patent, for example, at pg. 3, cols. 33-41, pg. 21, cols. 6-10 and claim 14.
124. Said Accused Instrumentalities sold or leased by Defendant Comcast include set-top boxes leased to subscribers of Defendant Comcast's cable television service offered via Defendant Comcast's cable television delivery system.
125. Said set-top boxes deploy a java virtual machine enabling said set-top boxes to perform the receiving and processing functions claimed in the '425 Patent. See, for example, interactive2046.rssing.com/chan-69700172/all-p2.html ("Myriad's Java Virtual Machine will provide a key element in our device software RDK providing a consistent and high-performance virtual machine to power this platform" says Steve Reynolds, Sr. VP, Customer Premises Equipment, Comcast).
126. Said Accused Instrumentalities include said receiving apparatus disclosed and claimed in the '425 Patent comprising virtual machine functionality designed to receive and process as claimed therein said print() or println() statements of the PrintWriter method contained

in said code documented above generated by said CQSAPIStatePageServlet, CMBStatsServlet, AdminServlet, AdminServletBase, CQSQueuePermissionsPage, CQSUserPageServlet, CNSWorkerStatePageServlet, CNSTopicPermissionPage, CNSSubscriptionPageServlet, CQSQueueMessagesPageServlet, CQSAddQueuePermissionPage, CNSUserPageServlet, CNSEditTopicDisplayNamePage and CNSRawMessageDeliveryPolicyPage.

127. Said Accused Instrumentalities include said receiving apparatus disclosed and claimed in the '425 Patent comprising virtual machine functionality designed to receive and process as claimed therein said print() or println() statements of the PrintWriter method contained in said code documented above generated by said public class HConfig.

128. Said Accused Instrumentalities include said receiving apparatus disclosed and claimed in the '425 Patent comprising virtual machine functionality designed to receive and process as claimed therein said print() or println() statements of the PrintWriter method contained in said code documented above generated by said jdwpGen node AbstractCommandNode, AbstractGroupNode, AbstractNamedNode, AbstractTypeListNode, AbstractTypeNode, AltNode, BooleanTypeNode, ByteTypeNode, CommandNode, CommandSetNode, ConstantNode, ConstantSetNode, ErrorNode, ErrorSetNode, FieldTypeNode, FrameTypeNode, IntTypeNode, LocationTypeNode, LongTypeNode, MethodTypeNode, Node, OutNode, ReferenceIDTypeNode, ReferenceTypeNode, RepeatNode, ReplyNode, RootNode, SelectNode, StringTypeNode, UntaggedValueTypeNode and ValueTypeNode.

129. Said Accused Instrumentalities include said receiving apparatus disclosed and claimed in the '425 Patent comprising virtual machine functionality designed to receive and process

as claimed therein said print() or println() statements of the PrintWriter method contained in said code documented above generated by said public class MC.

130. Said Accused Instrumentalities include said receiving apparatus disclosed and claimed in the '425 Patent comprising virtual machine functionality designed to receive and process as claimed therein said print() or println() statements of the PrintWriter method contained in said code documented above generated by said upnp Home Network node ContainerNode, ItemNode, Node, UPNP Home Network Device, Service & Icon Discovery and VideoItem.

RELIEF WARRANTED FOR INFRINGEMENT OF U.S. PATENT 8,713,425

131. Defendant Comcast's infringing activity alleged above comprises the compelling reason Defendant Comcast's cable television service and product is acquired in the consumer marketplace.

132. Defendant Comcast's infringing activity alleged above creates a performance advantage in Defendant Comcast's cable television delivery system that drives demand for Defendant Comcast's respective cable television service and customer premises equipment.

133. Progme has no adequate remedy at law against Defendant Comcast's acts of infringement and, unless Defendant Comcast is enjoined from continuing to infringe the '425 Patent, Progme will suffer irreparable harm.

134. Defendant Comcast had prior constructive knowledge of the '425 Patent as indicated in **Exhibit C**, the patent number "**Patent 8,713,425**" marked on the PrintHD.TV home page (located at www.printhd.tv) web page, labelling at the bottom of the page on 5/27/14, to provide constructive notice thereof pursuant to 35 U.S.C. § 287.

135. Progme has at all times complied with 35 U.S.C. § 287, providing Defendant Comcast with prior constructive notice, which constituted consistent and continuous notice of the '425 Patent being infringed by Defendant Comcast.

136. The method of generating and encoding and the apparatus for receiving and processing the hyperlink address string structured as a PrintWriter method claimed in the '425 Patent and alleged infringed herein is capable of being produced in a physical device, a web page, and have been and are noticed in said web page for constructive notice by marking pursuant to 35 U.S.C. § 287.

137. Defendant Comcast received actual notice thereof from service of the original complaint on or about 11/16/15.

138. Defendant Comcast received actual notice thereof from service of the Progme's First Amended Complaint on 2/22/16.

139. Defendant Comcast received actual notice thereof from service of Progme's **NOTICE OF DISMISSAL OF DEFENDANTS AND ACTION AGAINST DEFENDANTS PURSUANT TO FRCP 41(a)(1)(A)(i)** on 11/25/15.

140. In addition, Defendant Comcast received actual notice thereof from service of this Fourth Amended Complaint.

141. As a result of Defendant Comcast's acts of infringement, Progme has suffered and will continue to suffer damages in an amount to be proved at trial. Pursuant to 35 U.S.C § 284, Progme is entitled to adequate damages to compensate for infringement including a reasonable royalty from the date of Defendant Comcast's notice of the '425 Patent. Progme has no means of ascertaining the full extent of Defendant Comcast's infringement of the '425 Patent and the amount of Progme's damages resulting from said infringement

except through the production of evidence thereof in Defendant Comcast's sole possession and control.

PRAYER FOR RELIEF

142. WHEREFORE, Progme prays for the following relief:

- a. A judgment in favor of Progme that Defendant Comcast has infringed, directly and indirectly by way of inducement and/or contributory infringement, literally and/or under the doctrine of equivalents, at least one claim of the '425 Patent;
- b. A permanent injunction enjoining Defendant Comcast and its officers, directors, agents, servants, employees, affiliates, divisions, branches, subsidiaries, parents, and all others acting in concert or privity with any of them from infringing, inducing the infringement of, or contributing to the infringement of the '425 Patent;
- c. Award to Progme the damages to which it is entitled by law and under 35 U.S.C. § 284 for Defendant Comcast's past infringement and any continuing or future infringement up until the date Defendant Comcast is finally and permanently enjoined from further infringement, including both compensatory damages and treble damages for willful infringement;
- d. A finding that this is an "exceptional action" and a judgment and order requiring Defendant Comcast to pay the costs of this action (including all disbursements) as well as attorneys' fees as provided by 35 U.S.C. § 285;
- e. Award to Progme pre-judgment and post-judgment interest on its damages and

- f. Such other further relief in law or equity to which Progme may be justly entitled.

DEMAND FOR JURY TRIAL

143. Pursuant to Rule 38 of the Federal Rules of Civil Procedure, Progme hereby demands a trial by jury as to all issues so triable.

Date: November 17, 2017

Respectfully submitted,

/s/ David A. Reams

David A. Reams, *Pro Hac Vice*

Law Office of David A. Reams, P.C.

208 Clair Hill Drive

Rochester Hills, MI 48309

248-376-2840

Lead Attorney for Progme Corporation

CERTIFICATE OF SERVICE

I hereby certify that on this 17th day of November, 2017, I electronically filed the foregoing paper with the Clerk of Court using the ECF system which will send notification of such filing to all counsel of record.

Signed,

/s/ David A. Reams
David A. Reams